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TITLE: METHOD AND SYSTEM FOR MANAGING PROMOTIONAL TELEMATICS SERVICES

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METHOD AND SYSTEM FOR MANAGING PROMOTIONAL TELEMATICS SERVICES

FIELD OF THE INVENTION

This invention relates generally to wireless communications with a mobile vehicle. More specifically, the invention relates to a method and system for managing promotional telematics services within a telematics equipped vehicle.

BACKGROUND OF THE INVENTION

The opportunity to utilize wireless features in a mobile vehicle is ever increasing as the automobile is being transformed into a communications and entertainment platform as well as a transportation platform. Wireless features include wireless vehicle communication, networking, maintenance and diagnostic services for a mobile vehicle.

Typically, conventional wireless systems within mobile vehicles (e.g. telematics units) provide voice communication. Recently, these wireless systems have been utilized to update systems within telematics units, such as, for example radio station presets. Other systems within mobile vehicles, such as, for example a power train control may be updated as well. Information may also be collected from systems and subsystems within mobile vehicles and provided to a vehicle manufacturer for analysis, such as, for example system usage, component wear, and the like.

The present invention advances the state of the art.

SUMMARY OF THE INVENTION

One aspect of the invention includes a method for operating a telematics unit within a mobile vehicle including receiving a request to initiate at least one telematics service, determining if the at least one requested telematics service is associated with a special billing plan, and implementing the special billing plan responsive to the determination.

In accordance with another aspect of the invention, a computer readable medium storing a computer program includes: computer readable code for processing a request to initiate at least one telematics service; computer readable code for determining if the at least one requested telematics service is associated with a special billing plan; and computer readable code for implementing the special billing plan responsive to the determination.

In accordance with yet another aspect of the invention, a system for operating a telematics unit within a mobile vehicle is provided. The system includes means for receiving a request to initiate at least one telematics service. Means for determining if the at least one requested telematics service is associated with a special billing plan is provided. Means for implementing the special billing plan responsive to the determination is also provided.

The aforementioned, and other features and advantages of the invention will become further apparent from the following detailed description of the presently preferred embodiments, read in conjunction with the accompanying drawings. The detailed description and drawings are merely illustrative of the invention rather than limiting, the scope of the invention being defined by the appended claims and equivalents thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates an operating environment for implementing wireless communication within a mobile vehicle communication system;

FIG. 2 is a block diagram of telematics based programming gateway in accordance with an embodiment of the present invention,

FIG. 3 is a flow diagram of one embodiment of a method of managing promotional telematics services within a telematics equipped mobile vehicle, in accordance with the present invention; and

FIG. 4 is a flow diagram of another embodiment of a method of managing promotional telematics services within a telematics equipped mobile vehicle, in accordance with the present invention.

DETAILED DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates one embodiment of system for data transmission over a wireless communication system, in accordance with the present invention at **100**. Mobile vehicle communication system (MVCS) **100** includes a mobile vehicle communication unit (MVCU) **110**, a vehicle communication network **112**, a telematics unit **120**, one or more wireless carrier systems **140**, one or more communication networks **142**, one or more land networks **144**, one or more client, personal or user computers **150**, one or more web-hosting portals **160**, and one or more call centers **170**. In one embodiment, MVCU **110** is implemented as a mobile vehicle equipped with suitable hardware and software for transmitting and receiving voice and data communications. MVCS **100** may include additional components not relevant to the present discussion. Mobile vehicle communication systems and telematics units are known in the art.

MVCU **110** may also be referred to as a mobile vehicle throughout the discussion below. In operation, MVCU **110** may be implemented as a motor vehicle, a marine vehicle, or as an aircraft. MVCU **110** may include additional components not relevant to the present discussion.

MVCU **110**, via a vehicle communication network **112**, sends signals to various units of equipment and systems (detailed below) within MVCU **110** to perform various functions such as unlocking a door, opening the trunk, setting personal comfort settings, and calling from telematics unit **120**. In facilitating interactions among the various communication and electronic modules, vehicle communication network **112** utilizes network interfaces such as controller-area network (CAN), International Organization for Standardization (ISO) Standard 9141, ISO Standard 11898 for high-speed applications, ISO Standard 11519 for lower speed applications, and Society of Automotive Engineers (SAE) Standard J1850 for high-speed and lower speed applications.

MVCU **110**, via telematics unit **120**, sends and receives radio transmissions from wireless carrier system **140**. Wireless carrier system **140** is implemented as any suitable system for transmitting a signal from MVCU **110** to communication network **142**.

Telematics unit **120** includes a digital signal processor (DSP) **122** connected to a wireless modem **124**, a global positioning system (GPS) unit **126**, an in-vehicle memory **128**, a microphone **130**, one or more speakers **132**, and an embedded or in-vehicle mobile phone **134**. In other embodiments, telematics unit **120** may be implemented without one or more of the above listed components, such as, for example GPS unit **126** or speakers **132**. Telematics unit **120** may include additional components not relevant to the present discussion.

In one embodiment, DSP **122** is implemented as a microcontroller, controller, host processor, or vehicle communications processor. In an example, DSP **122** is implemented as an application specific integrated circuit (ASIC). In another embodiment, DSP **122** is implemented as a processor working in conjunction with a central processing unit (CPU) performing the function of a general purpose processor. GPS unit **126** provides longitude and latitude coordinates of the vehicle responsive to a GPS broadcast signal received from a

one or more GPS satellite broadcast systems (not shown). In-vehicle mobile phone **134** is a cellular-type phone, such as, for example an analog, digital, dual-mode, dual-band, multi-mode or multi-band cellular phone.

DSP **122** executes various computer programs that control programming and operational modes of electronic and mechanical systems within MVCU **110**. DSP **122** controls communications (e.g. call signals) between telematics unit **120**, wireless carrier system **140**, and call center **170**. In one embodiment, a voice-recognition application is installed in DSP **122** that can translate human voice input through microphone **130** to digital signals. DSP **122** generates and accepts digital signals transmitted between telematics unit **120** and a vehicle communication network **112** that is connected to various electronic modules in the vehicle. In one embodiment, these digital signals activate the programming mode and operation modes, as well as provide for data transfers. In this embodiment, signals from DSP **122** are translated into voice messages and sent out through speaker **132**.

Communication network **142** includes services from one or more mobile telephone switching offices and wireless networks. Communication network **142** connects wireless carrier system **140** to land network **144**. Communication network **142** is implemented as any suitable system or collection of systems for connecting wireless carrier system **140** to MVCU **110** and land network **144**.

Land network **144** connects communication network **142** to client computer **150**, web-hosting portal **160**, and call center **170**. In one embodiment, land network **144** is a public-switched telephone network (PSTN). In another embodiment, land network **144** is implemented as an Internet protocol (IP) network. In other embodiments, land network **144** is implemented as a wired network, an optical network, a fiber network, other wireless networks, or any combination thereof. Land network **144** is connected to one or more landline telephones. Communication network **142** and land network **144** connect wireless carrier system **140** to web-hosting portal **160** and call center **170**.

Client, personal or user computer **150** includes a computer usable medium to execute Internet browser and Internet-access computer programs for sending and receiving data over land network **144** and optionally, wired or wireless communication networks **142** to web-hosting portal **160**. Personal or client computer **150** sends user preferences to web-hosting portal through a web-page interface using communication standards such as hypertext transport protocol (HTTP), and transport-control protocol and Internet protocol (TCP/IP). In one embodiment, the data includes directives to change certain programming and operational modes of electronic and mechanical systems within MVCU **110**. In operation, a client utilizes computer **150** to initiate setting or re-setting of user-preferences for MVCU **110**. User-preference data from client-side software is transmitted to server-side software of web-hosting portal **160**. User-preference data is stored at web-hosting portal **160**.

Web-hosting portal **160** includes one or more data modems **162**, one or more web servers **164**, one or more databases **166**, and a network system **168**. Web-hosting portal **160** is connected directly by wire to call center **170**, or connected by phone lines to land network **144**, which is connected to call center **170**. In an example, web-hosting portal **160** is connected to call center **170** utilizing an IP network. In this example, both components, web-hosting portal **160** and call center **170**, are connected to land network **144** utilizing the IP network. In another example, web-hosting portal **160** is connected to land network **144** by one or more data modems **162**. Land network **144** sends digital data to and from modem **162**, data that is then transferred to web server **164**. Modem **162** may reside inside web server **164**. Land network **144** transmits data communications between web-hosting portal **160** and call center **170**.

Web server **164** receives user-preference data from user computer **150** via land network **144**. In alternative embodiments, computer **150** includes a wireless modem to send data to web-hosting portal **160** through a wireless communication network **142** and a land network **144**. Data is received by land network **144** and sent to one or more web servers **164**. In one embodiment, web server **164** is implemented as any suitable hardware and software capable of providing web services to help change and transmit personal preference settings from a client at computer **150** to telematics unit **120** in MVCU **110**. Web server **164** sends to or receives from one or more databases **166** data transmissions via network system **168**. Web server **164** includes computer applications and files for managing and storing personalization settings supplied by the client, such as door lock/unlock behavior, radio station preset selections, climate controls, custom button configurations and theft alarm settings. For each client, the web server potentially stores hundreds of preferences for wireless vehicle communication, networking, maintenance and diagnostic services for a mobile vehicle.

In one embodiment, one or more web servers **164** are networked via network system **168** to distribute user-preference data among its network components such as database **166**. In an example, database **166** is a part of or a separate computer from web server **164**. Web server **164** sends data transmissions with user preferences to call center **170** through land network **144**.

Call center **170** is a location where many calls are received and serviced at the same time, or where many calls are sent at the same time. In one embodiment, the call center is a telematics call center, facilitating communications to and from telematics unit **120** in MVCU **110**. In an example, the call center is a voice call center, providing verbal communications between an advisor in the call center and a subscriber in a mobile vehicle. In another example, the call center contains each of these functions. In other embodiments, call center **170** and web-hosting portal **160** are located in the same or different facilities.

Call center **170** contains one or more voice and data switches **172**, one or more communication services managers **174**, one or more communication services databases **176**, one or more communication services advisors **178**, and one or more network systems **180**.

Switch **172** of call center **170** connects to land network **144**. Switch **172** transmits voice or data transmissions from call center **170**, and receives voice or data transmissions from telematics unit **120** in MVCU **110** through wireless carrier system **140**, communication network **142**, and land network **144**. Switch **172** receives data transmissions from and sends data transmissions to one or more web-hosting portals **160**. Switch **172** receives data transmissions from or sends data transmissions to one or more communication services managers **174** via one or more network systems **180**.

Communication services manager **174** is any suitable hardware and software capable of providing requested communication services to telematics unit **120** in MVCU **110**. Communication services manager **174** sends to or receives from one or more communication services databases **176** data transmissions via network system **180**. Communication services manager **174** sends to or receives from one or more communication services advisors **178** data transmissions via network system **180**. Communication services database **176** sends to or receives from communication services advisor **178** data transmissions via network system **180**. Communication services advisor **178** receives from or sends to switch **172** voice or data transmissions.

Communication services manager **174** provides one or more of a variety of services, including enrollment services, navigation assistance, directory assistance, roadside assistance, business or residential assistance, information services assistance, emergency assistance, and communications assistance. Communication services manager **174** receives service-preference requests for a variety of services from the client via computer **150**, web-hosting portal **160**, and land network **144**. Communication services manager **174** transmits user-

preference and other data to telematics unit **120** in MVCU **110** through wireless carrier system **140**, communication network **142**, land network **144**, voice and data switch **172**, and network system **180**. Communication services manager **174** stores or retrieves data and information from communication services database **176**. Communication services manager **174** may provide requested information to communication services advisor **178**.

In one embodiment, communication services advisor **178** is implemented as a real advisor. In an example, a real advisor is a human being in verbal communication with a user or subscriber (e.g. a client) in MVCU **110** via telematics unit **120**. In another embodiment, communication services advisor **178** is implemented as a virtual advisor. In an example, a virtual advisor is implemented as a synthesized voice interface responding to requests from telematics unit **120** in MVCU **110**.

Communication services advisor **178** provides services to telematics unit **120** in MVCU **110**. Services provided by communication services advisor **178** include enrollment services, navigation assistance, real-time traffic advisories, directory assistance, roadside assistance, business or residential assistance, information services assistance, emergency assistance, and communications assistance. Communication services advisor **178** communicate with telematics unit **120** in MVCU **110** through wireless carrier system **140**, communication network **142**, and land network **144** using voice transmissions, or through communication services manager **174** and switch **172** using data transmissions. Switch **172** selects between voice transmissions and data transmissions.

FIG. 2 is a block diagram of a telematics based programming gateway in accordance with an embodiment of the present invention. **FIG. 2** shows a telematics system **200** for managing promotional telematics services within a telematics equipped mobile vehicle. In **FIG. 2**, the telematics system includes a mobile vehicle **210** having a telematics unit **220** coupled to one or more vehicle system modules **290** via a vehicle communication bus **212**, and a communication network **270**, such as, for example a public switched telephone network (PSTN). Telematics unit **220** further includes a database **228** that contains programs **231**, stored data **232**, updated data **233** and triggers **234**. Vehicle system module (VSM) **290** further includes a program **291** and stored data **292**. In one embodiment, VSM **290** is located within telematics unit **220** and communication bus **212** is implemented as a communication bus. In **FIG. 2**, the elements are presented for illustrative purposes and are not intended to be limiting. Telematics system **200** may include additional components not relevant to the present discussion.

Telematics unit **220** is any telematics device enabled for operation with a telematics service provider, such as, for example telematics unit **120** as described with reference to **FIG. 1**. Telematics unit **220** in vehicle **210** is in communication with communication network **270** (e.g. a "PSTN"). Telematics unit **220** includes volatile and non-volatile memory components for storing data and programs. In one embodiment, memory components in telematics unit **220** contain database **228**.

Database **228** includes one or more programs **231** for operating telematics unit **220**, such as, for example, for managing promotional telematics services within a telematics equipped mobile vehicle. A program module receives a request to initiate a telematics service from a user interface, such as, for example a voice-recognition application at updated data **233**. In an example, the request to initiate a telematics service is cached within updated data **233**. The request to initiate a telematics service is stored at stored data **232**. In one embodiment,

telematics unit **220** acts as a data cache for requests to initiate telematics services, caching any received request to initiate a telematics services that are provided to one or more vehicle system modules **290** for the telematics unit **220**. In another embodiment, program **231** includes software for receiving a request to initiate a telematics service, determining if the requested telematics service is associated with a special billing plan, implementing the special billing plan responsive to the determination, and operating the telematics unit within the requested telematics service.

Vehicle system module (VSM) **290** is any vehicle system control module having software and hardware components for operating, controlling or monitoring one or more vehicle systems. In one embodiment, VSM **290** is a visual user interface, such as, for example a monitor capable of receiving and displaying video signals as is known in the art. In this embodiment, VSM **290** operates a promotional telematics service, such as, for example a mapping/direction finding service and displays the promotional telematics service via the visual user interface portion of VSM **290**. In another embodiment, VSM **290** is a controller for controlling a vehicle system such as, for example, informational services, stock quotes, weather, traffic, shopping, sports scores, games, horoscopes and the like.

Vehicle system module **290** contains one or more processors, one or more memory devices and one or more connection ports. In one embodiment, VSM **290** includes a software switch for scanning received information, such as, for example user input to identify that data has been received. VSM **290** is coupled to a vehicle communication bus **212**, and therefore to any other device that is also coupled to vehicle communication bus **212**. The vehicle communication bus is also referred to as a vehicle communication network. In one embodiment, VSM **290** is directly coupled to telematics unit **220**, such as, for example vehicle communication bus **212** coupling telematics unit **220** to vehicle

system modules **290**. In an example, vehicle communication bus **212** is a vehicle communication network **112** as described in **FIG. 1**, above. In another embodiment, VSM **290** is indirectly coupled to telematics unit **220**.

VSM **290** includes one or more programs **291** and stored data **292** stored in memory. In one embodiment, program **291** includes software for receiving a request to initiate a telematics service and storing the received request to initiate a telematics service at stored data **292**. In this embodiment, the received request is passed to telematics unit **220** for processing, such as, for example determining if the requested telematics service is associated with a special billing plan. If the requested telematics service is associated with a special billing plan, telematics unit **220** implements the special billing plan and instructs VSM **290** to operate any associated telematics services. In another embodiment, program **291** includes software for receiving a request to initiate a telematics service, determining if the requested telematics service is associated with a special billing plan, implementing the special billing plan responsive to the determination, and operating the telematics unit within the requested telematics service.

FIG. 3 is a flow diagram of an embodiment of a method of managing promotional telematics services within a telematics equipped mobile vehicle. In **FIG. 3**, method **300** may utilize one or more systems detailed in **FIGS. 1** and **2**, above. The present invention can also take the form of a computer usable medium including a program for configuring an electronic module within a vehicle. The program stored in the computer usable medium includes computer program code for executing the method steps described in **FIG. 3**. In **FIG. 3**, method **300** begins at step **310**.

At step **320**, a request to initiate at least one telematics service is received. In one embodiment, the requested telematics service is a promotional telematics service. Examples of telematics services include mapping/direction finding informational services, stock quotes, weather, traffic, shopping, sports scores, games, horoscopes and the like. In one embodiment, the request is received by a telematics unit, such as, for example telematics unit **220** of **FIG. 2**. In another embodiment, the request is received by a vehicle system module (VSM), such as, for example VSM **290** of **FIG. 2**.

At step **330**, a determination as to if the at least one requested telematics service is associated with a special billing plan. If the determination is positive regarding an association between the requested telematics service and a special billing plan, then method **300** advances to step **340**. In one embodiment, if the determination is negative regarding an association between the requested telematics service and a special billing plan, then a standard billing plan is implemented. In an example, the special billing plan determination identifies a particular special billing plan based on specific conditions, such as, the number dialed, the geographic location of the telematics device when the determination is made, and the like. In another example, an initial determination may produce a negative determination regarding an association between the requested telematics service and a special billing plan. In this example, a later determination may produce a positive determination regarding an association between the requested telematics service and a special billing plan, such as, accessing a premium telematics service, the time limit for a promotional service is exceeded, and the like.

At step **340**, a special billing plan is implemented responsive to the determination. In one embodiment, implementing the special billing plan responsive to the determination includes determining if a remaining special time value of the special billing plan is not equal to zero, decrementing the remaining special time value when the remaining time value is not equal to zero, and incrementing a special billing time value when the remaining time value is zero. In an example, the remaining time value is a predetermined time value. In an example, the remaining special time value and the special billing time value are values expressed in time units, such as, hours, minutes and seconds. In another example, the remaining special time value and the special billing time value are values expressed as a number of times a particular service has been requested/implemented. In yet another example and referring to **FIG. 2** above, the special billing plan is implemented within VSM **290** as described above. In another example, the special billing plan is implemented within telematics unit **220** and telematics unit **220** instructs VSM **290** to operate the requested telematics service.

In another embodiment, if a remaining special time value of the special billing plan is not equal to zero, a reminder message is sent to a user interface informing a user of the remaining special time value of the special billing plan. In this embodiment, the user can be solicited for user feedback, subscription, and the like.

In yet another embodiment, when the remaining time value is zero, a reminder message is sent to the user interface informing the user the remaining time value is zero. In this embodiment, the user can be solicited for user feedback, subscription, and the like.

At optional step **350**, the telematics unit is operated within the requested telematics service. At optional step **360**, an updated telematics service account value is sent to a call center. Examples of an updated telematics service account value include a special time value and a special billing time value. In an example and referring to **FIG. 2** above, telematics unit **220** sends the updated telematics service account value to a call center via communication network **270** (e.g. a "PSTN").

At step **370**, the method ends.

FIG. 4 is a flow diagram of another embodiment of a method of managing promotional telematics services within a telematics equipped mobile vehicle. In **FIG. 4**, method **400** may utilize one or more systems detailed in **FIGS. 1** and **2**, above. The present invention can also take the form of a computer usable medium including a program for configuring an electronic module within a vehicle. The program stored in the computer usable medium includes computer program code for executing the method steps described in **FIG. 4**. In **FIG. 4**, method **400** begins at step **410**.

At step **415**, the telematics unit ensures a prepaid function is not initiated. In one embodiment, the telematics unit ensures the prepaid function within the telematics unit is not initiated.

At step **420**, the call is initiated in data mode. At decision step **430**, a determination is made as to if there are outstanding service provider units to decrement. In one example, the outstanding service provider units result from a previous session. If there are outstanding service provider units to decrement, method **400** advances to step **435**. If there are not outstanding service provider units to decrement, method **400** advances to step **437**.

At step **435**, the number of units to decrement is sent to an accounting device, such as, for example the telematics unit. At step **437**, the telematics unit is switched to voice mode.

At step **440**, a user is prompted for a request. In one embodiment, the user is prompted utilizing a user interface, such as, for example a video user interface, an audio user interface, and the like.

At decision step **450**, an end of call determination is made. If the call is ended, method **400** advances to decision step **490**. If the call is not ended, method **400** advances to step **460**. At decision step **460**, a determination is made as to if the user request is a free service, such as, for example a promotional service. If the requested service is free, method **400** advances to decision step **480**. If the requested service is not free, method **400** advances to step **470**.

At step **470**, the service is provided. In one embodiment, the service is a charged standard voice call. At step **475**, time units utilized are added to an account balance based on the service provided. Method **400** then returns to step **440**.

At decision step **480**, a determination is made as to if a free timer associated with the free service has expired. If the free timer associated with the free service has expired, method **400** advances to step **485**. If the free timer associated with the free service has not expired, method **400** advances to step **487**. At step **485**, the free timer associated with the free service begins counting time units. At step **487**, the service is provided. Method **400** then returns to step **440**.

At decision step **490**, a determination is made as to if there are outstanding units to decrement from an account balance. If there are outstanding units to decrement from an account balance, method **400** advances to step **495**. If there are not outstanding units to decrement from an account balance, method **400** advances to step **497**. At step **495**, the number of units utilized is sent to an accounting device to decrement from the previous balance, such as, for example the telematics unit. At step **497**, the call is terminated.

The above-described methods and implementation for managing promotional telematics services within a telematics equipped mobile vehicle are example methods and implementations. These methods and implementations illustrate one possible approach for managing promotional telematics services within a telematics equipped mobile vehicle. The actual implementation may vary from the method discussed. Moreover, various other improvements and modifications to this invention may occur to those skilled in the art, and those improvements and modifications will fall within the scope of this invention as set forth in the claims below.

The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive.